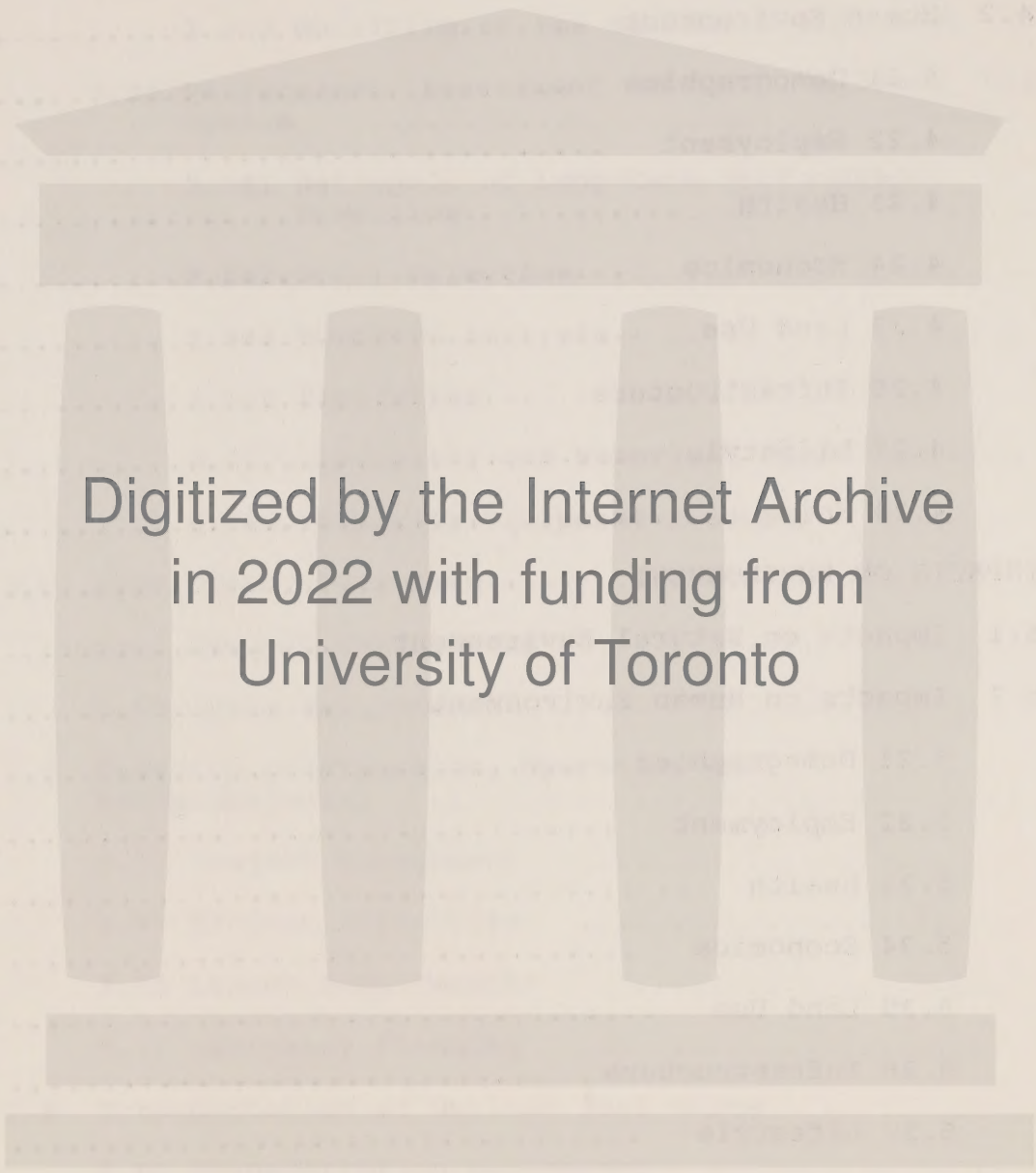
GUIDELINES FOR THE PREPARATION OF AN ENVIRONMENTAL IMPACT STATEMENT

ENVIRONMENTAL ASSESSMENT PANEL REVIEWING THE NUCLEAR FUEL WASTE MANAGEMENT AND DISPOSAL CONCEPT

June 1991

TABLE OF CONTENTS



INTRODUCTION

This document was prepared by the Environmental Assessment Panel reviewing the Nuclear Fuel Waste Management and Disposal Concept. It contains the draft Guidelines for the preparation of an Environmental Impact Statement (EIS). The draft EIS Guidelines identify the issues which the Panel has determined should be addressed in the EIS. The EIS will be prepared by the proponent, Atomic Energy of Canada Limited (AECL).

The federal Environmental Assessment and Review Process requires that proposed projects that may result in significant adverse environmental effects be referred for public review to an Environmental Assessment Panel appointed by the Minister of the Environment. In September, 1988, AECL submitted for public review its concept for the deep geological burial of nuclear fuel wastes in the Canadian Shield. A Panel was appointed in October, 1989, and was given the mandate to examine the safety and acceptability of the AECL Concept, along with a broad range of nuclear fuel waste management issues.

The Panel held public scoping meetings in fourteen cities during October and November, 1990 to obtain comments on the identification of issues which should be addressed by the proponent in its EIS. These comments, as well as those received from written submissions, were considered by the Panel when developing its draft EIS Guidelines.

The draft EIS Guidelines will be available to the public for comment until September 16, 1991. The Panel will then finalize this document and issue it to AECL. Additional information may be requested by the Panel from other sources, including government agencies, in areas of their expertise or regulatory responsibility.

The Panel will receive the EIS submitted by the proponent and will distribute it to review participants for comment. If the Panel decides that the EIS is inadequate, it will ask for additional information before scheduling public hearings. Once the Panel is satisfied that the EIS has adequately addressed the issues identified in the Guidelines, it will announce public hearings. Review participants will have the opportunity to present their views on the environmental and socio-economic aspects of the AECL proposal at the public hearings.

The Panel will consider all of the submissions received during public hearings and will present its conclusions and recommendations in its report to the Ministers of Environment and of Energy, Mines and Resources. The Minister of Energy, Mines and Resources, after discussion with the Minister of Environment, will decide whether the project should proceed, and if so, under what conditions.

The Nuclear Fuel Waste Management and Disposal Concept proposed by AECL will be referred to as "the Concept". Interim storage and transportation of nuclear fuel waste are considered to be part of the Concept. The areas of responsibility of the proponent(s) should be clearly identified.

The EIS should describe all components of the proposed AECL Concept and its potential impacts on the human and natural environments. The need for the Concept should be fully explained, and alternative nuclear fuel waste management options should be examined in comparison. Potential impacts of the Concept on the human and natural environments should be discussed by summarizing the present state of existing environments, and predicting the possible impacts that could result from the Concept. Measures which could reduce or eliminate adverse impacts should be explained.

The Panel would appreciate the proponent presenting its EIS in the format outlined in the Guidelines. AECL should address the items identified in each section of the Guidelines, but should not be limited to these items as some subjects may require a broader discussion. Both positive and negative effects of the Concept should be included.

Due to the complexity of the technical aspects that the proponent must address, the use of diagrams and charts wherever possible is recommended. A glossary of technical terms would be helpful, as well as the proponent's definitions of words which may otherwise be interpreted in various ways (e.g. environment, disposal, safety, modelling, risk, acceptability, etc.). A bibliography of the references used to prepare the EIS should be included.

"Short-term" and "long-term" will be used throughout this document to identify ranges of time. Short-term refers to the time period of planned human activities at the proposed repository. Long-term refers to the time period after the closure of the facility.

The EIS Summary and main document should be available in both English and French. Technical documents should be provided in the appropriate working language.

1. SUMMARY

The EIS should begin with a summary of the document and its findings. The summary should be easily understood by a layperson. It should provide the reader with a concise idea of the contents of the EIS and should focus on items of specific interest.

The EIS summary should be included as part of the EIS. It should be prepared for wide distribution as a document separable from the EIS itself.

2. NUCLEAR FUEL WASTE - THE PROBLEM

The EIS should explain the overall problem of nuclear fuel waste management in Canada. It should describe the origin and nature of nuclear fuel waste to provide a clear understanding of the requirements for the safe management of used fuel. Current methods of nuclear fuel waste management in Canada should be outlined, and the need for long-term waste management should be examined.

2.1 Nature of Nuclear Fuel Waste

The EIS should clearly explain the nature and magnitude of the present nuclear fuel waste management problem, by describing the origin and characteristics of the radioactive and non-radioactive components of nuclear fuel waste. This should include, but not be limited to, the following:

- the nuclear fuel cycle;

- the types, sources, volumes and locations of nuclear fuel wastes in storage at the present time and at future time intervals, as well as the uncertainties and the reasons for the uncertainties in future projections (e.g. a nuclear moratorium, the implementation of reprocessing, nuclear expansion, modification of nuclear technology, etc.);

- the physical and chemical characteristics of nuclear fuel waste;

- the characteristics that are significant to the management of nuclear fuel waste, and the risks to living organisms that necessitate a safe management system;

- the nature of the physical and chemical changes that occur in the nuclear fuel while in the reactor, after removal from the reactor, and while in storage;

- the possible changes in the nature and characteristics of nuclear fuel waste due to changes in nuclear power technology or in energy policies;

- the short-term and long-term variations in radiation characteristics of the components of nuclear fuel waste including decay heat, radiation intensity and radiation products; and

2.2 Current Nuclear Fuel Waste Management in Canada

The EIS should describe current nuclear fuel waste management practices in Canada. The objectives of the various waste management programs should be outlined, as well as the ability of current programs to meet their objectives. The proponent should

discuss the environmental and ethical acceptability of present practices in terms of the risks to surrounding human and natural environments.

Past performance of the nuclear industry in managing nuclear fuel waste should be documented. Containment failures during storage at, and transport between, nuclear facilities and any subsequent impacts on human and natural environments should be addressed. The history of the proponent's experience with containment designs and construction materials should be described.

Trends and characteristics of public concern related to nuclear fuel waste management since the beginning of the production of this waste should be described. Changing social perceptions on this issue should be addressed, including any information on preferences for irretrievable versus retrievable management, and the attitudes of residents of populations situated near current storage facilities.

The proponent should compare Canada's nuclear waste management practices to international practices.

2.3 The Need for Long-Term Management of Nuclear Fuel Waste - Risks to the Health of Natural and Human Environments

The EIS should discuss the need for long-term management of nuclear fuel waste and the current risks to the health of human and natural environments incurred by the present management of nuclear fuel waste. The proponent should identify all means through which nuclear fuel waste may directly or indirectly impact on these environments, and the groups within these environments which are considered to be at greatest risk and why. The discussion should include the following:

- definition of risk and health;
- sources of radiation in natural and human environments;
- processes and mechanisms through which radioactive substances interact with elements of the natural and human environments;
- recipients of risk from radiation exposure;
- explanation of effects of radiation on the natural and human environments, including probability and magnitude of risks;
- evolution of health regulations related to radiation, including national and international radiation exposure limits;
- the relationship between the presence of radiation and the incidence of health problems;

- methodology used for risk and health assessment;

- risks resulting from social (e.g. human intrusion), geological (e.g. earthquakes, meteorite impacts, isostatic rebound) and environmental factors (e.g. climate change);

- identification of risks related to accidents and worst case scenarios (e.g. an unexpected major leakage);

- perceived versus actual risks; and

- pathways and linkages within our social systems which enable people to understand and internalize risk perceptions.

2.4 Provisions for the Security of Long-Term Management of Nuclear Fuel Waste

The EIS should discuss the provisions that currently exist to ensure the security of long-term management of nuclear fuel waste in Canada and internationally, including provisions to safeguard against situations where loss of knowledge or nuclear expertise, or political instability prevents the safe long-term management of nuclear fuel waste. This discussion should examine the history of the performance of these provisions and the ability to accomodate the requirements of future long-term management options.

3. THE AECL CONCEPT

The EIS should thoroughly describe the Concept and its suitability for the long-term management of nuclear fuel wastes. Due to the complexity and recent development of the technology involved, the lack of previous experience in its implementation, and the conceptual nature of information concerning a potential site, it is important that the discussion of the Concept is presented as clearly as possible. The following aspects of the Concept should be addressed throughout this document, wherever they may be appropriate:

- the assumptions and rationale underlying all significant decisions;

- regulatory criteria (particularly for health and risk), their adequacy, areas where further development of criteria is required, and areas where no criteria presently exist;

- the treatment of uncertainties, in particular, irreducible uncertainties, and areas of knowledge where varying opinions remain unreconciled within the scientific community;

- the use and justification of site-specific data, and its representativeness of natural and human environments in the Canadian Shield, or elsewhere;

- the flexibility of the total system or key components of the system to accomodate possible unanticipated changes, e.g. changes in technology, host rock preference, understanding of environmental hazards and risks, regulatory criteria, social priorities and values, and government policies.

3.1 Capability to Address the Need for Long-Term Management

The EIS should discuss the capability of the AECL Concept to address the need for long-term management of nuclear fuel waste and the risks to the health of human and natural environments that would be incurred by the Concept. The proponent should identify all means through which nuclear fuel waste may directly or indirectly impact on these environments, and the groups within these environments which are considered to be at greatest risk and why, by addressing the items identified in section 2.3. In addition to examining the risks resulting from social and environmental factors, the risks directly relating to the burial of nuclear fuel waste (e.g. post-closure failure in the repository system either monitored or unmonitored) should be discussed. A comparison should be made of the distribution of risk incurred by current nuclear fuel waste management practices versus that which would be incurred by the Concept.

3.2 Description of Concept

The proponent should provide a general description of the proposed Concept, including interim storage, transportation, and surface and sub-surface facilities. The EIS should describe the management of a nuclear fuel bundle from its removal from inside a reactor to its emplacement in the proposed underground vault.

3.3 Development of Concept

The EIS should summarize the development of the Concept by describing the history of the Concept's development, the rationale for developing a Concept based on irretrievable burial, and the criteria and assumptions related to the development of the Concept. The EIS should summarize all major decisions taken during the formulation and development of the Concept; the likelihood of decision reversal and the implications of Concept design and implementation; and to what extent a reversal of these decisions could be accomodated.

3.31 History of Concept

In describing the history of the development of the Concept, the EIS should examine the following:

- the sequence of events that has resulted in the current nuclear fuel waste management program in Canada;

- the roles of key parties involved in decision-making;

- the adequacy of public consultation in the development of the nuclear fuel waste management program;

- a summary and schedule of research completed, planned or in progress, including the identification of research which may not be completed before public hearings by the Environmental Assessment Panel; and

- the current status of the program.

3.32 Rationale for Irretrievable Burial

The EIS should outline the reasons for developing a Concept based on irretrievable burial instead of retrievable storage. The implications of the proposed Concept on future generations and the present society's responsibilities to these generations should be discussed. The advantages and disadvantages of irretrievable burial versus retrievable storage, and implications regarding overall risk, should be explained.

3.33 Criteria and Assumptions

The proponent should outline the regulatory criteria with which it must comply, as well as the criteria it has established and assumptions used during the development of its Concept. This should include the following:

- definitions of safety and acceptability;

- criteria and assumptions for safety, and technical and social acceptability;

- criteria used for decision to close and decommission an underground repository;

- criteria and assumptions for responsibility to future generations;

- the ability of the Concept to meet the requirements of regulatory criteria, as well as the proponent's own criteria for safety and technical and social acceptability.

3.4 Irretrievable Burial Alternatives

This section should evaluate alternative methods of irretrievable burial. It should compare their costs and benefits, and their safety and acceptability with respect to impacts on surrounding environments. The relative importance of social, economic and environmental criteria in judging the acceptability of alternatives should be presented. The discussion should include the following:

- implications of a number of repository sites instead of one central facility;

- alternative Canadian geological environments;

- international nuclear fuel waste management plans and practices; and

- alternative media for irretrievable burial available in Canada, e.g. beneath sea-beds and within ice sheets.

3.5 Isolation of Nuclear Fuel Waste - The Multiple Barrier System

The EIS should explain the objectives, principles and assumptions involved in the development of the proposed Multiple Barrier System to isolate nuclear fuel waste. In this explanation, the term 'barrier' should be defined, and examples of barriers from the entire system should be given. The EIS should also describe each component of the Multiple Barrier System, its specific functions and, in particular, the linkages among the various components. The EIS should also demonstrate how possible deficiencies in one or more of the barriers and realistic changes in the vault environment could affect the overall performance of the Multiple Barrier System.

The EIS should discuss procedures for the evaluation of the performance of the components and of the total system for the anticipated time required for nuclear fuel waste isolation. This discussion should identify the critical stages and expected times leading to the ultimate failure of each component and of the whole system, and locate these stages on time charts. Uncertainties in these expected times should be discussed, and critical stages leading to the ultimate failure of each component and of the entire system should be identified.

The EIS should also demonstrate that adequate long-term performance criteria have been developed for each of the components of the system, and for the system as a whole. A comparison with regulatory criteria adopted for nuclear fuel waste management programs in other leading countries should also be provided.

3.51 The Engineered Barriers System

The EIS should describe the components of the proposed Engineered Barriers System and the methods employed for the evaluation of these components. It should describe the characteristics of the vault environment, and the processes that govern radionuclide migration within that environment. It should also describe and evaluate the changes that may occur in these characteristics and processes over both the short and the long term. The EIS should address the possibility of components of the nuclear fuel waste attaining critical mass.

3.511 Nuclear Fuel Waste

The EIS should describe the role of the nuclear fuel waste itself, as part of the Multiple Barrier System. The effectiveness of the nuclear fuel waste as a barrier should be evaluated, taking into account its chemical and physical stability, and its susceptibility to damage from its own radiation and heat.

The hazardous components in the nuclear fuel waste must be described, and in particular the important radionuclides and the heat production as a function of time must be discussed. The EIS must:

- identify the radionuclides that are the "most critical" indicating how "most critical" is defined; and

- describe the relevant chemical and physical properties of the critical nuclides.

The effect of heat and radiation on the physical and chemical integrity of nuclear fuel waste must be discussed; particularly with respect to the rates of ultimate release of specific radionuclides. The EIS should describe the methods used to estimate radionuclide release and consider the following:

- the development of voids and strained regions;

- the effect of radiation-induced changes on leaching rates of structural components and of critical nuclides;

- the potential for gas generation due to biological, chemical and nuclear processes and its effects;

- the potential for other biological and microbiological interactions with nuclear fuel waste; and

- the possible dissolution mechanisms of nuclear fuel waste including biologically mediated mechanisms and selective leaching.

3.512 The Container System

The EIS should describe the role of the container system in the Multiple Barrier System. The components of the proposed container system that would function as a barrier against the migration of radionuclides and other contaminants should be examined. The preferred container system should be compared to and contrasted with alternative container system concepts developed by waste management programs in other countries, and significant differences should be explained and justified.

The EIS must describe and justify the design and manufacturing

criteria applied to the container system. This discussion must include the following:

- the selection of container design including provisions for change and future improvements;

- the selection of structural materials for the container system including present and future availability of materials, costs of materials and provisions for change;

- the suitability of the designed container system for the selected method of handling and emplacement; and

- the inspection procedures and quality control for all stages from fabrication to emplacement under full-scale operational conditions.

The EIS should discuss the circumstances and mechanisms leading to all possible causes of container failure, in particular container breaching either by corrosion mechanisms operating in the vault environment or by the crushing action of geological pressures. Measures to delay or reduce the possibility of breaching, and to minimize its effects should also be described.

The EIS must describe the predicted performance of the container system, by identifying all probable modes of (total and local) failure of the container, taking into account the thermomechanical history from fabrication through emplacement. The description must include the following:

- a definition of "container failure";

- a description of possible models for container failure;

- a discussion of the mechanisms of weakening of the material of the container system including biocorrosion mechanisms;

- a discussion of the environment in which the container is emplaced with respect to its possible influence on corrosion and other modes of failure; and

- the application of possible natural and other analogs to the container system and its components.

The EIS must describe methods to be used for monitoring the integrity and performance of the container under vault conditions including:

- a description of monitoring methods to assess performance and to anticipate early failure;

- a statement of the criteria for tolerable deviations from

predicted behaviour; and

- a consideration of the effects of radiation and radiolysis on corrosion and embrittlement of a container.

3.513 The Vault System

The EIS should describe the role of the vault in the Multiple Barrier System. It should examine the entire proposed vault system, and all aspects of the vault design, construction, operation, sealing and subsequent monitoring that bear on its functioning as a barrier against the migration of radionuclides and other contaminants. The preferred vault system should be compared to and contrasted with alternative vault system concepts developed by waste management programs in other countries, and significant differences should be explained and justified.

The EIS must describe the criteria and procedures to be used in the design, construction and operation of the vault. This description should include the following:

- a description of the intended function of the vault within the Multiple Barrier System;

- the choice of excavation technology and its justification;

- a description of the criteria used in the design of the vault, including the choice of an appropriate depth;

- an evaluation of in-room emplacement of containers versus borehole emplacement, with reference to vault construction, overall stability and operation;

- a discussion of criteria for abandonment or rejection of a vault or sections of a vault in which the rock or fracture characteristics are found to be different from those expected;

- an evaluation of the potential for and the consequences of unplanned collapse or closure of the underground openings;

- a demonstration of the capability to characterize in-situ stresses and estimate elastic strain energy at the appropriate depths in a granitic rock mass, and their potential short-term and long-term consequences; and

- an evaluation of the creation of fractures and incipient fractures in the rock mass surrounding individual vault rooms and the overall vault complex during all phases of construction and operation, and a description of the procedures for identification and mitigation of the adverse effects of fracturing.

The EIS must describe the potential for, and consequences of, unplanned events such as collapse or closure of the underground excavations during loading and early monitoring stages. This should include:

- a description and evaluation of the expected post-construction stress conditions in the overall vault design;

- a discussion and evaluation of the methods and hazards of handling the nuclear fuel waste at the various stages;

- a description and evaluation of the container emplacement method and technology, and the quality assurance and control procedures to be used during emplacement;

- an outline of the procedures and standards for the training of staff and the operation of equipment;

- a demonstration of the ability to retrieve, decontaminate, and repair damaged containers during all phases of vault operation; and

- a description of procedures for handling contaminated materials and equipment;

- a demonstration of the availability of appropriate instrumentation and monitoring techniques for the assessment of deviations from predicted geomechanical and hydraulic behaviour.

The EIS should describe the vault sealing program including the following:

- the criteria to be used in making the decision to seal the vault including an assessment of acceptable differences between the forecast and the observed performance of the vault;

- the sources of sealing materials (buffer, backfill and grout), and the methods used to extract or manufacture the sealing materials;

- the nature and evaluation of the sealing materials;

- the transportation, emplacement and compaction methods, and the equipment used;

- the nature of the contacts between the sealing material and the rock mass and the container, and the method of dealing with development of gaps between these components; and

- the expected long-term performance and integrity of the

sealing materials in the vault, and the uncertainties involved.

3.514 Modelling of the Engineered Barriers System

The EIS should discuss the modelling of the Engineered Barriers System. In the formulation of this discussion, consideration should be given to specific issues raised in Section 3.54 where appropriate and the following should be included:

- a description of the models used to represent processes and mechanisms in the Engineered Barriers System, including fluid flow, gas flow, heat flow, radionuclide transport, the transport and transformation of chemical and biological constituents, and the coupling between these processes and mechanisms;

- assumptions made concerning processes and parameters, and the justification for making them;

- uncertainties in the ranges of parameters used to describe the relevant processes and properties, and in the expected changes in those parameters;

- the reliability and sensitivity of mathematical models for the evaluation of barrier behaviour over the long term, and of the migration of contaminants through the barrier;

- the representation of the interface between the Engineered Barriers System and the rock mass barrier;

- a discussion of the flexibility of the vault model to accomodate changes in vault geometry and asymmetrical vault geometries;

- the performance of existing deep, large excavations in plutonic rocks.

3.52 Rock Mass Barrier

The EIS should describe the role of the rock mass as part of the Multiple Barrier System. The EIS should identify the mechanisms for contaminant transport, demonstrate a knowledge of those rock mass characteristics and processes that govern radionuclide migration, and describe the changes that may occur in these characteristics and processes both in the short and the long term. It should also define and identify critical pathways for radionuclides through the rock mass.

Criteria for the rejection of a rock mass barrier on the basis of its hydraulic, physical, chemical, and biological properties, as well as on the basis of the seismic risk assessment of the rock

mass, should be stated.

3.521 Rock Mass and Groundwater Properties

The EIS should discuss the rock mass and groundwater properties and mechanisms, with particular focus on critical pathways, that could affect the migration of radionuclides and other contaminants. The discussion should include the following:

- the methods used to identify and characterize fracture systems and major fracture zones;

- ranges of rates and volumes of fluid flow through the rock mass to be expected under present and future conditions, and the associated uncertainties;

- channelization of groundwater flow within individual fracture zones and methods for determining rates and locations of channelized flow (with confidence limits);

- critical pathways, mechanisms and residence times for contaminant migration through the rock mass, and critical modes of transport for the most mobile radionuclides (liquid and gaseous);

- relevant physical, chemical, biological and biochemical processes in the rock mass that may impede or enhance the transport of radionuclides along the critical pathways;

- linkages among the physical, chemical and biochemical processes in the vault, the rock mass, and the surface environment;

- short-term or transient changes in the processes and properties of the rock mass and the groundwater system that may be expected due to the establishment of the repository;

- long-term changes that may affect the rock mass or the groundwater system, for example global climate change, post-glacial isostatic rebound, or renewed glaciation;

- potential changes in the relevant properties and processes in the rock mass due to stress changes or possible geologic events such as earthquakes; and

- procedures for and limitations of seismic risk assessment (e.g. seismic monitoring, geologic evidence for faulting and earthquakes).

3.522 Modelling of the Host Rock Barrier

The EIS should include a description of the models used to represent processes and mechanisms in the rock mass and the groundwater system. Consideration should be given to specific issues raised in Section 3.54 where appropriate. The following points should also be discussed:

- fluid, gas and heat flow, radionuclide transport, the transport and transformation of chemical and biological constituents, stress changes in the rock mass, as well as the coupling between these processes and mechanisms;

- assumptions made concerning processes and mechanisms, and the justification for making them;

- the method chosen for representing fracture zones and the flow within them, including any channelized flow, and the justification for the choice;

- the method chosen for translating results of hydrogeologic tests into input parameters for models;

- the method chosen to relate stress changes in the rock mass to changes in the hydraulic parameters;

- the method used for translating results obtained from the groundwater flow model into groundwater velocities;

- uncertainties in the ranges of parameters used to describe the relevant processes and properties, and in the expected changes in those parameters;

- the reliability and sensitivity of mathematical models for the long-term prediction of rock mass behaviour and contaminant migration; and

- the representation of the interface between the host rock and the surface environment.

3.53 Surface Environment

The EIS should describe the role of the surface environment in the isolation of nuclear fuel wastes. The EIS should also discuss the expected behaviour of any radionuclides and other contaminants released into the surface environment from the vault. The EIS should identify the critical pathways and mechanisms for contaminant transport, describe those surface environment characteristics and processes that govern radionuclide migration, and describe the changes that may occur in these characteristics and processes both in the short and the long term.

3.531 Surface Environment Properties

The EIS should discuss the properties of and mechanisms within the surface environment that could affect the migration of radionuclides and other contaminants. The discussion of surface environmental properties should include, but not be restricted to, the following:

- a description of the critical chemical, biological (including microbiological) and physical processes that control transport, retardation and concentration of radionuclides in the surface environment, and a discussion of the reasons for the selection of these processes and of the assumptions used to describe how these processes function;

- ranges of rates and volumes of fluid movement through the surface environment that are expected under present and future conditions;

- an identification and description of the critical pathways, barriers and mechanisms for the transport and concentration of these radionuclides;

- a discussion of the linkages between the physical, chemical and biochemical processes in the rock mass and in surface environments;

- short-term or transient changes in the processes and properties of the surface environment that may be expected due to the establishment of the repository; and

- progressive long-term changes that may affect the surface environment, for example global climate change, post-glacial isostatic rebound, or renewed glaciation.

3.532 Modelling of the Surface Environment

The EIS should discuss the models used to represent processes and mechanisms in the surface environment. In the formulation of this discussion, consideration should be given to specific issues raised in Section 3.74 where appropriate and the following should be included:

- fluid flow, gas flow, radionuclide transport and the transport and transformation of chemical and biological constituents, as well as the coupling between these processes and mechanisms;

- assumptions made concerning processes and parameters, and the justification for making them;

- uncertainties in the ranges of parameters used to describe the relevant processes and properties, and in the expected changes

in those parameters;

- the reliability and sensitivity of mathematical models for the long-term prediction of surface environment behaviour and contaminant migration; and

- an accounting for time-dependent variations in parameters including short-term variations (e.g. weather) and long-term variations (e.g. glaciation).

3.54 Performance Assessment of the Multiple Barrier System

The EIS should discuss in sufficient detail the procedures used to assess the long-term performance of the Multiple Barrier System. Description of the various components (i.e. mathematical modelling, radiological and non-radiological analogs, research results, etc.) of the procedures, and how these components are used and integrated should be included in the discussion. The extent to which these procedures are flexible enough to accomodate future development and refinements should be examined. The performance assessment should be compared and contrasted with alternative assessments developed by nuclear waste management programs in other countries and significant differences should be explained and justified.

3.541 Rationale of Long-Term Performance Modelling

The EIS should define mathematical modelling and discuss the rationale for the use of mathematical modelling of the long-term performance of the Multiple Barrier System as part of overall performance assessment. This discussion should cover, but not be restricted to, the following:

Objectives and limitations:

A clear statement of the objectives and limitations of the modelling should be given.

Verification and validation:

The procedure adopted for verification and validation of the models used for the evaluation of repository performance over the full predicted life of the repository (including the use of natural analogs) should be explained. This explanation should address the following questions:

- what constitutes sufficient validation;

- the use of experimental laboratory and field techniques for the validation of models and parameter values;

- how the objectives and scope of modelling are justified if validation involves a time scale much shorter than the real

time scale of the system;

- the extent to which such models should be validated generically; and

- additional research required to achieve such generic validation.

Uncertainties:

The EIS should discuss uncertainties and the effects of uncertainties in the performance assessment. This discussion should include the following:

- the adequacy of the range of processes represented in the models for the long time scale;

- the validity of the adopted methods of dealing with uncertainties (i.e. representing physical parameters by means of probability density functions);

- the adequacy of the parametric probability functions used for the long time scale;

- the amount that uncertainty should be reduced and the effort that should be undertaken to reduce uncertainty by that amount; and

- the amount of uncertainty that is unquantifiable.

Confidence:

In view of the uncertainties involved with performance assessment, discuss the confidence in results produced by the models, and explain how this confidence can be expressed.

3.542 Model Selection

The EIS should elaborate on model selection and development procedures. This elaboration should include the following:

- the basis for the selection of mechanisms to be included in the model, and the justification for rejection of other mechanisms;

- a justification of all significant simplifying assumptions;

- an estimate of the effect of assumptions (i.e. can the effect be expressed as an additional safety factor);

- the approach used to represent the coupling of certain processes, and the criteria used for selecting either coupled

or decoupled analyses;

- the approach used to represent uncertainty;

- the mechanisms represented in the model, and the justification for including or excluding mechanisms;

- the method and justification for the selection of the physical parameter ranges;

- the flexibility available to respond to unforeseen circumstances; and

- the ability to incorporate new information into the models.

A schematic representation of the relationships and linkages of models within the entire performance assessment complex should also be included in the EIS.

3.543 Scenario Analysis

The EIS should discuss the use of scenario analysis in the performance assessment of the disposal concept. This discussion should include the following points:

- the identification of the relevant physical, chemical, and biological factors to be included in a particular scenario, and the justification for rejecting other factors;

- the criteria for the selection or rejection of scenarios;

- a description of the scenarios selected;

- the procedure for obtaining the governing parameters and their ranges, and the justification for the selection of these parameters and ranges;

- the procedure for analysing and comparing different scenarios; and

- the meaning and interpretation of results.

3.544 Simulation

The EIS should describe how the response of the physical system (i.e. rock mass, groundwater flow system, thermal regime, geochemical regime, biological regime) is simulated during all stages of implementation of the proposed Concept. Of particular interest is the modelling of interactions between the various physical and biological processes. A time chart would be useful in portraying this description. The simulation should involve comparisons between the baseline environment and conditions during:

- the construction stage;

- the loading stage;

- the stage immediately following closure.

The EIS should also consider:

- the longer term (i.e. hundreds or thousands of years after closure) under unchanged external conditions;

- the response to long-term changes in the geosphere and biosphere (i.e. isostatic rebound, renewed glaciation) and associated changes in ecosystems; and

- the response to catastrophic events (e.g. earthquakes, meteorite impacts).

3.545 Conceptual and Numerical Simplification

The EIS should address the possibility that significant radionuclide transport pathways and scenarios may not have been addressed adequately because of conceptual and numerical simplifications made for computational convenience.

3.546 Computing Equipment Capability

The EIS should evaluate the adequacy of the computing equipment to accomplish general simulations while utilizing the full capabilities of the available models (i.e. a three dimensional simulation involving the coupled processes of groundwater flow, heat transport, geomechanical response, and radionuclide transport using a reasonably detailed finite element grid). The EIS should discuss what additional computing equipment, if any, is required for a reasonable utilization of available models.

3.6 Site Characterization

In addition to developing an acceptable concept for the long-term management of nuclear fuel waste, the proponent should demonstrate a capability for investigating and characterizing actual candidate sites in the Canadian Shield or elsewhere. Characterization procedures must include unambiguous criteria for determining when an actual site satisfies, or how it could be modified to satisfy, the generic requirements for acceptability. Criteria for rejection of a site should also be included.

The proponent should define an ideal site, and the likelihood of finding an ideal site. The description should integrate aspects of the natural and human environments. In the case of multiple candidate sites, the description should indicate procedures for ranking sites, including the involvement of the public in these

procedures.

3.61 Natural Environment

The discussion of the investigation and characterization of natural environment aspects of candidate sites should include the following:

- a demonstration that appropriate techniques have been developed, proven, and are available for sufficient description and mapping of all relevant properties of and processes occurring in the host rock mass and surface environment of the candidate sites;

- the extent to which remote sensing should be used for site characterization, and the integration of remote and on-site observation in site characterization;

- an understanding of the uncertainties involved in the description of candidate sites, with respect to processes and parameters, the changes in space and time of these processes and parameters, and the capability to quantify these uncertainties;

- a procedure for relating the natural environment aspects of the site description to human environment aspects; and

- the criteria, and the hierarchy in which the criteria are applied, for acceptance or rejection of candidate sites on the basis of site characteristics, uncertainties in the site characteristics and the ability to describe a site.

3.62 Human Environment

The discussion of the investigation and characterization of human environment aspects of candidate sites should include the following:

- a demonstration that appropriate techniques have been developed, proven and are available for sufficient description of all relevant characteristics and interactions occurring in the human environment of the candidate sites;

- a procedure for relating the human environment aspects of the site description to natural environment aspects; and

- the criteria, and the hierarchy in which the criteria are applied, for acceptance or rejection of candidate sites on the basis of socio-economic characteristics of the site, and the ability to describe those characteristics.

3.7 Facility Construction, Operation and Decommissioning

The EIS should describe the major activities which would occur during the construction, operation and decommissioning of the Concept facility, and the management-related aspects of these activities. This description should include the following: project management, project activities, labour requirements, and emergency planning.

3.71 Project Management

The EIS should describe the overall project management of the Concept. This should include the following:

- the project management structure, identifying responsibility and accountability of major sub-systems of the overall operation such as: interim storage, transportation, site construction, waste transfer and emplacement, vault closure, site restoration, and security;

- private and/or public corporation operation in any of the above sub-systems, and the impact on regulatory requirements to control and enforce safety, health and environmental regulation and standards;

- description of conflict resolution and proposed dispute settlement procedures to resolve differences between agencies, communities and contractors;

- scheduling of project phases, construction activities, and construction or improvement of major community infrastructure elements, as well as overall target completion dates;

- short- and long-term community involvement; and

- methodology for ensuring adequate notification to future generations of location, contents and monitoring records of repository after closure.

3.72 Project Activities

The proponent should describe the activities associated with the implementation of the various phases of the Concept. This should include the following:

- description of activities related to each phase of Concept;

- need for changes in local infrastructure to support Concept;

- transportation of construction materials, equipment, etc. to and from the site;

- interim storage of nuclear fuel wastes at facility;

- handling of wastes at facility; and

- remedial measures, if required.

3.73 Labour Requirements

The EIS should contain information concerning the labour required for the various phases of the Concept, and related health, accomodation and transportation plans. This should include the following:

- employment and personnel policies related to the utilization of local, regional and/or migrant labour force;

- labour force size and skills required during various project phases;

- training programs (especially for local/regional labour force);

- schedule of migrant worker influx(es) during the various project phases;

- worker safety and health programs and facilities to respond to accidents or emergency medical needs;

- need for local or remote, permanent or temporary, living accomodation for migrant labour force; and

- transportation of migrant workers to and from the work site;

3.74 Emergency Planning

The proponent should outline its emergency planning and response system. This discussion should include the following:

- an emergency response plan, including responsibilities of parties involved, availability of equipment, and public warning systems;

- accident scenarios;

- the certainty or uncertainty of the longevity of nuclear expertise to respond to emergencies, in the case of the decline of the nuclear industry;

- financial responsibility for emergency response; and

- training of emergency response team.

3.8 Transportation of Nuclear Fuel Waste

The EIS should describe the proposed plan for the transport of nuclear fuel waste from storage facilities to underground emplacement. The transport plan should explain the various components of the transportation system and their operation throughout all stages of the Concept implementation. The risks associated with the various components, stages and transport modes should be addressed. The following should be discussed: transportation management, the transport container system, the operation of the transportation system, labour requirements, and emergency planning.

3.81 Transportation Management

The EIS should discuss the management of the transportation of nuclear fuel waste from storage to its emplacement in an underground repository. This should include the following:

- identification of management structure

- private and/or public corporation operation of transportation system, and the impact of regulatory requirements to control and enforce safety, health and environmental regulation and standards;

- management of transport across political borders; and

- processes for community and government involvement in transport decisions.

3.82 Transport Container System

The proponent should describe the transport container system. The preferred container should be compared to alternative container systems developed in Canada or elsewhere, and significant differences should be explained and justified.

The EIS should describe and justify the design and manufacturing criteria applied to the container system. The discussion should include the following:

- the selection of container design including provisions for change and future improvements;

- the selection of structural materials for the container system including present and future availability of materials, cost of materials and provisions for change;

- the suitability of the designed container system for the selected method of handling and transferral;

- the possibility of a dual purpose container system suitable for transport and emplacement; and

- the inspection procedures and quality control for all stages from fabrication to operation.

The EIS should discuss the circumstances and mechanisms leading to all possible causes of container failure. Measures to prevent the possibility of breaching, and to minimize its effects should be described. The EIS should describe the predicted performance of the container system, taking into account the probable modes of failure. This should include the following:

- a definition of "container failure";

- a description of possible models for container failure; and

- a discussion of the mechanisms of weakening of the material of the container system.

The EIS must describe methods to be used for monitoring the integrity and performance of the container system during transportation. This should include:

- a description of monitoring methods to assess performance and to anticipate early failure; and

- a statement of the criteria for tolerable deviations from predicted behaviour.

3.83 Operation of Transportation System

The EIS should explain the operation of the transportation system. This should include the following:

- proposed modes of transport;

- proposed transport routes, and criteria for acceptance and rejection of transport routes;

- public involvement with decisions concerning the choices of transport modes and routes;

- proposed procedures for the transfer of used fuel from storage pools to repository;

- risks related to all aspects of transport;

- safety record of current mode of transport of nuclear fuel waste;

- the volume, frequency and timing of shipments;

- measures to address public concern regarding the transport of nuclear fuel waste and methods of keeping the public informed of transport methods, routes, etc.;

- safety measures and their enforcement (e.g. hours of work, speed of transport, drug abuse, training, escorts, maintenance of vehicles, scheduling of shipping, inspection of containment unit and vehicle);

- monitoring of the location of the transport unit;

- measures to respond to transport delays (vehicle operation problems, traffic congestion, blockades, sabotage, criteria for returning used fuel to storage pools);

- demonstration that considerations of climate, terrain, road and other physical conditions affecting transportation in a typical Canadian setting have been thoroughly examined; and

- remedial measures, if necessary.

3.84 Labour Requirements

The proponent should explain the labour requirements for the construction and operation of the transportation system. This should include the following:

- the use of local or outside workers ;

- initial and ongoing training of transport workers; and

- measures to ensure safety of workers during handling of used nuclear fuel.

3.85 Emergency Planning

The proponent should outline its emergency planning and response system. This discussion should include the following:

- an emergency response plan, including responsibilities of parties involved, availability of equipment, and public warning systems;

- accident scenarios;

- financial responsibility for emergency response; and

- initial and ongoing training of emergency response team.

3.9 Cost Analysis

The EIS should provide estimates of the total cost of the Concept, as well estimates for its major components, indicating sources of funding. The total cost should be compared to the cost of alternative nuclear fuel waste management options, to the extent possible. The cost of monitoring, possible mitigation and compensation should be included.

The EIS should also contain a risk-benefit analysis of key components of the Concept indicating their costs versus reductions in risk to the environment.

The budgeting and cost control system, and approval processes for additional funding should they be required, must be identified.

4. BASELINE ENVIRONMENT

Since a site has not been identified at this stage of the Concept development, the proponent should explain the approach it would take to summarizing information regarding the baseline natural and human environments.

4.1 Natural Environment

The proponent should define the natural environment that would be considered suitable for siting and should explain the study strategy that would be used to investigate the baseline environment that exists prior to interactions between the Concept and the receiving natural environment.

The study strategy should use an ecological scoping process to incorporate a conceptual outline of the ecological setting of the project, as well as conceptual views of the ecological habitats structure and function in the receiving environment. This conceptualization must explore the linkages between ecosystem components through cause and effect relationships, by including the following:

- the identification of temporal and spatial boundaries;
- the identification of physical, biological, chemical and energy components;
- the relationships between physical, biological, chemical and energy components;
- the identification of valued ecosystem components, indicators and sensitive species;
- the distribution and abundance of species and their habitats;

- food chains and radiation pathway mechanisms;

- ecological processes and effects of perturbations on stability, productivity, variability and resiliency;

- ecological succession; and

- the context within which significance of changes in valued ecosystem components, indicators and sensitive species can be determined.

The monitoring of the natural environment should be described. The subjects monitored, the agencies conducting monitoring, and the methodology used should be stated. Temporal and spatial boundaries of monitoring studies should be identified. Public involvement and the communication of results should be explained.

Scenarios and models would be helpful in explaining the characteristics of the natural environment. All assumptions and limitations should be stated.

4.2 Human Environment

The proponent should define the human environment that would be considered suitable for siting and should explain the study strategy that would be used to investigate the baseline environment that exists prior to interactions between the Concept and the receiving human environment.

The EIS should explain the sources of information used to determine information concerning, and indicators of: demographics, employment, health, economics, land use, infrastructure, lifestyle, and noise.

The monitoring of the human environment should be described. The subjects monitored, the agencies conducting monitoring, and the methodology used should be stated. Temporal and spatial boundaries of monitoring studies should be identified. Public involvement and notification of results should be explained.

Scenarios and models would be helpful in explaining the characteristics of the human environment. All assumptions and limitations should be stated.

4.21 Demographics

The study strategy should consider the demographics of potential host communities/regions. The discussion should include the following:

- present populations and their structures in terms of race, age, gender, births, deaths, etc.; and

- population trends.

4.22 Employment

The study strategy should consider the employment situation of potential host communities/regions. The discussion should include the following:

- sectors of employment;
- income levels;
- resident or non-resident labour force;
- employment trends; and
- local training facilities.

4.23 Health

The study strategy should consider the health of the potential host communities/regions. This should include an evaluation of the following:

- natural background radiation;
- the physical and psychological health of the population(s);
- the ability to measure physical and psychological health; and
- the monitoring of baseline health.

4.24 Economics

The study strategy should consider the economics of the potential host communities/regions. This should include an examination of:

- economic base;
- tax base;
- tax revenues; and
- personal income levels.

4.25 Land Use

The study strategy should consider land use patterns of potential host communities/regions. The following should be included in discussion:

- current land use plans;

- land use legislation;
- land use trends;
- valued areas (e.g. heritage, economic, natural, archaeological, spiritual);
- aboriginal views on land use; and
- aboriginal land claims.

4.26 Infrastructure

The study strategy should consider the infrastructure of the area surrounding the Concept. This should include the following:

- housing;
- transportation networks;
- education facilities;
- health services;
- recreational facilities;
- utilities; and
- energy supply.

4.27 Lifestyle

The study strategy should consider the current lifestyle of residents of the potential host communities/regions. This discussion should include the following:

- values of resident population(s);
- cultural and spiritual factors, including aboriginal cultural and spiritual factors;
- economic and life-sustaining activities; and
- recreation activities.

4.28 Noise

The study strategy should examine the current noise levels of the potential communities/regions.

5. IMPACTS ON THE ENVIRONMENT

Since a site has not been identified at this stage of the Concept development, the proponent should explain the approach it would take to summarizing information regarding the impacts of the Concept on natural and human environments.

5.1 Impacts on the Natural Environment

The proponent should explain the study strategy that would be used to investigate the short-term and long-term impacts of the Concept on the natural environment. The EIS should describe the impacts of the Concept resulting from normal operation and accident scenarios.

The study strategy should use an ecological scoping process to incorporate a conceptual outline of the project within an ecological setting, and should evaluate the impacts of the Concept on the ecological habitats structure and function of the receiving environment. This conceptualization must explore the linkages between the Concept and ecosystem components through cause and effect relationships, by including the following:

- the identification of temporal and spatial boundaries;
- the identification of impacts on physical, biological, chemical and energy components;
- the impacts on relationships between physical, biological, chemical and energy components;
- the impacts on valued ecosystem components, indicators and sensitive species;
- the impacts on the distribution and abundance of species and their habitats;
- the impacts on food chains and radiation pathway mechanisms;
- the impacts on ecological processes and effects of perturbations on stability, productivity, variability and resiliency;
- the impacts on ecological succession; and
- the significance of changes in valued ecosystem components, indicators and sensitive species.

The consideration of impacts should include the examination of risk, probability, magnitude, timing, geographic extent and significance of impacts. Prediction of impacts should be accompanied by the assumptions upon which they were based. Levels of confidence or uncertainty should be stated.

Cumulative effects should be addressed. The proponent should provide a definition and description of cumulative effects, and should identify the temporal and spatial boundaries of the effects, as well as the key elements of the environment that could be affected.

The monitoring of the impacts of the Concept on the natural environment should be described. The subjects monitored, the agencies conducting monitoring, and the methodology used should be stated. Temporal and spatial boundaries of monitoring studies should be identified. Public involvement and the communication of results should be explained.

Scenarios and models would be helpful in explaining the impacts of the Concept on the natural environment. All assumptions and limitations should be stated. Previous projects with similar short-term effects on the natural environment might provide relevant examples to enhance the reader's understanding of the impacts of a concept.

Mitigation measures, their effectiveness and any residual impacts should be outlined. Public consultation methods with regard to mitigation should be described.

5.2 Impacts on Human Environment

The proponent should explain the study strategy that would be used to investigate the short-term and long-term impacts of the Concept on the human environment. The EIS should describe the impacts of the Concept resulting from normal operation and accident scenarios.

The study strategy should examine the following socio-economic aspects of the human environment: demographics, employment, health, economics, land use, infrastructure, lifestyle, and noise.

The consideration of impacts should include the examination of risk, probability, magnitude, timing, geographic extent and significance of impacts. Prediction of impacts should be accompanied by the assumptions upon which they were based. Levels of confidence or uncertainty should be stated.

Cumulative effects should be addressed. The proponent should provide a definition and description of cumulative effects, and should identify the temporal and spatial boundaries of the effects, as well as the key elements of the environment that could be affected.

The monitoring of the impacts of the Concept on the human environment should be described. The subjects monitored, the agencies conducting monitoring, and the methodology used should be stated. Temporal and spatial boundaries of monitoring studies should be identified. Public involvement and notification of

results should be explained.

Scenarios and models would be helpful in explaining the impacts of the Concept on the human environment. All assumptions and limitations should be stated. Previous projects with similar short-term effects on the human environment might provide relevant examples to enhance the reader's understanding of the impacts of a concept.

Mitigation and compensation measures, their effectiveness and any residual impacts should be outlined. Public consultation methods with regard to mitigation should be described.

5.21 Demographics

The study strategy should examine the impacts of the Concept on demographics of the potential host communities/regions. This should include discussion of the impacts of the following:

- an influx of non-resident labour into host communities during construction;
- the creation of a new community, if necessary; and
- a boom and bust scenario.

5.22 Employment

The study strategy should consider the impacts of the Concept on the employment situation of the potential host communities/regions. This should include an examination of the impacts of the Concept on the following:

- employment opportunities during the various stages of Concept implementation, e.g. pre-construction, construction, operation, closure and post-closure;
- local employment incomes;
- non-resident versus resident labour force;
- availability of skilled labour force; and
- local training facilities.

5.23 Health

The study strategy should address the impacts of the Concept on the health of the potential host population(s). Health impacts should not be restricted to mortalities; in the case of exposure to radiation and radioactivity, the risks of total cancer, hereditary effects and other effects should be described. The discussion

should include the impacts of the Concept on the following:

- natural background radiation;
- non-radiological health impacts associated with the construction, operation, and closure of the waste management facility;
- non-radiological health impacts associated with the transportation of nuclear fuel waste;
- non-radiological health impacts related to an increase in local traffic;
- health impacts from radiation exposure to workers during construction, operation, closure and remedial repairs;
- health impacts from radiation exposure to workers during transportation of nuclear fuel waste;
- health impacts from radiation exposure to surrounding public during transportation;
- health impacts from radiation exposure to future generations in area surrounding facility;
- psychological stress resulting from concerns regarding health impacts ensuing from a nuclear fuel waste management facility; and
- perceived versus actual health impacts.

5.24 Economics

The study strategy should examine the short-term and long-term economic impacts of the Concept on the host community/region and to the Canadian public during the various stages of Concept implementation. This should include the following:

- the impacts of the Concept on the tax base;
- the impacts of the Concept on tax revenues;
- the impacts of the Concept on personal income levels;
- the impacts of the Concept on surrounding property values;
- the impacts of the Concept on tourism, mining and other industries;
- compensation for health effects;

- compensation for any loss in property values;

- compensation for any loss resulting from a possible decline in tourism or other industries;

- compensation for any decline in hunting, trapping, fishing or traditional way of life, including aboriginal traditional ways of life; and

- the financing of infrastructure improvements required to support the Concept.

5.25 Land Use

The study strategy should consider the effects of the Concept on the land use of the area surrounding the proposed facility. This section should evaluate the following:

- predicted changes in land use as a result of the Concept; and

- effects of Concept on aboriginal land claims.

5.26 Infrastructure

The study strategy should discuss the impacts of the Concept on the infrastructure of the surrounding area. The proponent should identify any requirement for infrastructure improvement that would be necessary to support the Concept, and the financial responsibility for any additional maintenance or provision of new services. This should include an evaluation of the following:

- housing;

- transportation networks;

- education facilities;

- health services;

- recreational facilities;

- utilities; and

- energy supply.

5.27 Lifestyle

The study strategy should examine the impacts of the Concept on the lifestyle of the surrounding populations. This should include consideration of the following:

- effects of Concept on the values and lifestyle of host

communities/regions;

- effects of Concept on aboriginal values and lifestyle.

5.28 Noise

The study strategy should consider the impacts of the Concept on the noise levels of the surrounding areas.

6. ALTERNATIVES TO IRRETRIEVABLE BURIAL

The EIS should describe alternative methods of managing nuclear fuel waste (excluding irretrievable burial). The proponent should discuss the capability of alternative management methods to address the need for long-term management of nuclear fuel waste, and the risks to the health of human and natural environments that would be incurred from these alternative methods. The proponent should identify the means through which nuclear fuel waste may directly or indirectly impact on these environments, and the groups within these environments which are considered to be at greatest risk and why. A comparison of the distribution of risk incurred by alternative management methods, current nuclear fuel waste management practices and that which would be incurred by the Concept should be made.

The retrievability of nuclear fuel waste, its advantages and disadvantages, and implications for overall risk, should be addressed.

The discussion of alternative management options should include the following:

- international research, experience and practices;
- alternative surface storage methods;
- retrievable underground storage;
- extraterrestrial removal;
- reprocessing;
- new technologies for managing nuclear fuel waste, e.g. transmutation.

7. SITE SELECTION PROCESS

The proponent should suggest a plan and process for selection of a facility site and transportation routes, should its Concept be determined to be safe and acceptable. This should include the following:

- identification of the agency that would administer the siting process;

- the use of past and current site selection methods, processes, and experiences in the development of the suggested process;

- identification of community decision-making structures and processes for the incorporation of these decision-making structures into site selection decisions;

- the criteria used to site the proposed repository and transport routes, the application of these criteria, and site elimination criteria;

- the integration of socio-economic and biophysical criteria in the site selection process;

- the integration of the proponent's site investigation and characterization into a site selection process; and

- the use of compensation.

INDEX

The following is an index of some of the subjects and issues addressed in the draft EIS Guidelines, and the corresponding sections where they are mentioned.

INDEX

INDEX

INDEX